Bioscience Applications

Youth Apprenticeship

BIOSCIENCE APPLICATIONS

Bioscience Applications youth apprentices perform biological laboratory procedures, including preanalytical, analytical and post-analytical work using common laboratory equipment. Apprentices must adhere to industry safety and security standards.

Length of Apprenticeship: One year. This pathway has a prerequisite of completion of the Bioscience Foundations program.

REQUIRED COMPETENCIES

Youth apprentices must become proficient in both general employability and occupation-specific competencies. All of these, and examples of how each can be demonstrated, are found in the following pages. A total of 10 occupational competencies must be learned for this occupation. Employers may substitute out one of these and should write in the competency they are adding. Youth apprentices must be evaluated on these competencies at least two times each year of their apprenticeship.

Competencies
1. Organize and analyze data
2. Present scientific data
3. Grow and/or care for plants and/or lab animals
4. Collect plant or animal tissues from source
5. Isolate and/or purify cells, microbes, nucleic acids and/or proteins
6. Quantify and/or identify cells, microbes, nucleic acids and/or proteins
7. Culture cells and/or microbes
8. Harvest cells and/or microbes
9. Perform spectroscopy
10. Perform chromatography
11. Perform microscopy
12. Perform restriction digests
13. Perform gel electrophoresis
14. Perform amplification
15. Perform blot assays
16. Prepare samples for nucleic acid sequencing
17. Perform cellular assays
18. Perform immunoassays (ELISA)
19. Perform protein quantification assays
20. Perform transfection
21. Perform basic cloning (transformation)
22. Run expression cloning tests

REGISTERED APPRENTICESHIP BRIDGING OPPORTUNITIES

The following Registered Apprenticeship is available in this area:

- Biotechnology Lab Support Assistant

POST-SECONDARY PATHWAY OPPORTUNITIES

There are several post-secondary pathway opportunities in this area. The following is a partial list.

- Biotechnology Laboratory Technician
- Medical Laboratory Technician

Bioscience Applications

Youth Apprenticeship

ON-THE-JOB LEARNING PERFORMANCE STANDARDS GUIDE

YOUTH APPRENTICE INFORMATION

Youth Apprentice Name
YA Coordinator
YA Consortium
School District

SIGNATURES

The On-the-Job Learning Performance Standards Guide includes a list of competencies youth apprentices learn through mentoring and training at the worksite.

Instructions for the Worksite Employers/Mentors and School-Based or YA coordinators: This document should be reviewed with the employer/mentor, school-based or YA coordinator on a regular basis with the youth apprentice to record progress and plan future steps to ensure completion of the required competencies. Mentors, school-based/YA coordinator, and the apprentice sign below.

Employer/Mentor

1st Evaluation (Required)	2nd Evaluation (Required)
Employer/Mentor Signature	Employer/Mentor Signature
Employer/Mentor	Employer/Mentor
Business/Company	Business/Company
Date Signed	Date Signed

3rd Evaluation (Optional)	4th Evaluation (Optional)
Employer/Mentor Signature	Employer/Mentor Signature
Employer/Mentor	Employer/Mentor
Business/Company	Business/Company
Date Signed	Date Signed

School-Based and/or YA Coordinator

1st Evaluation (Required) **2nd Evaluation (Required)**

School-Based and/or YA Coordinator Signature	School-Based and/or YA Coordinator Signature
School-Based and/or YA Coordinator	School-Based and/or YA Coordinator
School District or Organization	School District or Organization
Date Signed	Date Signed

3rd Evaluation (Optional) **4th Evaluation (Optional)**

School-Based and/or YA Coordinator Signature	School-Based and/or YA Coordinator Signature
School-Based and/or YA Coordinator	School-Based and/or YA Coordinator
School District or Organization	School District or Organization
Date Signed	Date Signed

Youth Apprentice

1st Evaluation (Required) **2nd Evaluation (Required)**

Youth Apprentice Signature	Youth Apprentice Signature
Youth Apprentice	Youth Apprentice
School District / High School	School District / High School
Date Signed	Date Signed

3rd Evaluation (Optional) **4th Evaluation (Optional)**

Youth Apprentice Signature	Youth Apprentice Signature
Youth Apprentice	Youth Apprentice
School District / High School	School District / High School
Date Signed	Date Signed

EMPLOYABILITY SKILLS (TO BE COMPLETED BY YA EMPLOYER/MENTOR)

All youth apprentices must demonstrate the key employability skills listed below in order to complete the YA program. They do so by earning at least a "Meets Expectation" rating in each. **At least two evaluations are required each year of a youth apprenticeship.** More columns are included below for those who choose to conduct more frequent reviews.

1	***Working to Meet Expectations:*** Needs improvement; requires much assistance and supervision; rarely displays this behavior
2	***Meets Expectations:*** Meets entry-level criteria; requires some supervision; often displays this behavior
3	***Exceeds Expectations:*** Exceeds entry-level criteria; requires minimal supervision; consistently displays this behavior

Employability Skills	**Rating**			
Competency and Rating Criteria	**Year One Evaluation Rating**			
	Initial	**Mid Year 1**	**Mid Year 2**	**Final**
1. Develops positive work relationships with others. *Examples of qualities and habits that the employee might exhibit include . . .* • Interacts with others with respect and in a non-judgmental manner • Responds to others in an appropriate and non-offensive manner • Helps co-workers and peers accomplish tasks or goals • Applies problem-solving strategies to improve relations with others • When managing others, shows traits such as compassion, listening, coaching, team development, and appreciation	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**
2. Communicates effectively with others *Examples of qualities and habits that the employee might exhibit include . . .* • Adjusts the communication approach for the target audience, purpose, and situation to maximize impact • Organizes messages/information in a logical and helpful manner • Speaks clearly and writes legibly • Models behaviors to show active listening • Applies what was read to actual practice • Asks appropriate questions for clarity	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**
3. Collaborates with others *Examples of qualities and habits that the employee might exhibit include . . .* • Works effectively in teams with people of diverse backgrounds regardless of sex, race, ethnicity, nationality, sexuality, religion, political views, and abilities • Shares responsibility for collaborative work and decision making • Uses the problem-solving process to work through differences of opinion in a constructive manner to achieve a reasonable compromise • Avoids contributing to an unproductive group conflict • Shares information and carries out responsibilities in a timely manner	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**

Employability Skills	Rating			
	Year One Evaluation Rating			
Competency and Rating Criteria	Initial	Mid Year 1	Mid Year 2	Final
4. Maintains composure under pressure *Examples of qualities and habits that the employee might exhibit include . . .* • Uses critical thinking to determine the best options or outcomes when faced with a challenging situation • Carries out assigned duties while under pressure • Acts in a respectful, professional, and non-offensive manner while under pressure • Applies stress management techniques to cope under pressure •	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
5. Demonstrates integrity *Examples of qualities and habits that the employee might exhibit include . . .* • Carries out responsibilities in an ethical, legal and confidential manner • Responds to situations in a timely manner • Takes personal responsibility to correct problems • Models behaviors that demonstrate self-discipline, reliability, and dependability	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
6. Performs quality work *Examples of qualities and habits that the employee might exhibit include . . .* • Carries out written and verbal directions accurately • Completes work efficiently and effectively • Performs calculations accurately • Conserves resources, supplies, and materials to minimize costs and environmental impact • Uses equipment, technology, and work strategies to improve workflow • Applies problem-solving strategies to improve productivity • Adheres to worksite regulations and practices • Maintains an organized work area	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
7. Provides quality goods or services (internal and external) *Examples of qualities and habits that the employee might exhibit include . . .* • Shows support for the organizational goals and principles by own personal actions • Displays a respectful and professional image to customers • Displays an enthusiastic attitude and desire to take care of customer needs • Seeks out ways to increase customer satisfaction • Produces goods to workplace specifications	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
8. Shows initiative and self-direction *Examples of qualities and habits that the employee might exhibit include . . .* • Prioritizes and carries out responsibilities without being told • Responds with enthusiasm and flexibility to handle tasks that need immediate attention • Reflects on any unsatisfactory outcome as an opportunity to learn • Improves personal performance by doing something different or differently • Analyzes how own actions impact the overall organization • Supports own action with sound reasoning and principles • Balances personal activities to minimize interference with work responsibilities	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3

Employability Skills	Rating			
	Year One Evaluation Rating			
Competency and Rating Criteria	**Initial**	**Mid Year 1**	**Mid Year 2**	**Final**
9. Adapts to change *Examples of qualities and habits that the employee might exhibit include . . .* • Shows flexibility and willingness to learn new skills for various job roles • Uses problem-solving and critical-thinking skills to cope with changing circumstances • Modifies own work behavior based on feedback, unsatisfactory outcomes, efficiency, and effectiveness • Displays a "can do" attitude	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
10. Demonstrates safety and security regulations and practices *Examples of qualities and habits that the employee might exhibit include . . .* • Follows personal safety requirements • Maintains a safe work environment • Demonstrates professional role in an emergency • Follows security procedures • Maintains confidentiality	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
11. Applies job-related technology, information, and media *Examples of qualities and habits that the employee might exhibit include . . .* • Applies technology effectively in the workplace • Assesses and evaluates information on the job • Assesses training manuals, website, and other media related to the job	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
12. Fulfills training or certification requirements for employment *Examples of this requirement may include . . .* • Participation in required career-related training and/or educational programs • Passing certification tests to qualify for licensure and/or certification • Participation in company training or orientation	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
13. Sets personal goals for improvement *Examples of this requirement may include . . .* • Setting goals that are specific and measurable • Setting work-related goals that align with the organization's mission • Identifying strategies to reach goals • Reflecting on goal progress to regularly evaluate and modify goals	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3

OCCUPATIONAL COMPETENCIES
(TO BE COMPLETED BY YA EMPLOYER/MENTOR)

Youth apprentices must earn a rating of at least "MEETS EXPECTATIONS" in each competency by the conclusion of the apprenticeship. A total of 10 competencies, 9 must be from the list below. If necessary, employers can substitute one competency with another occupationally appropriate skill. That skill should be added to the competency list for assessment. **At least two evaluations are required each year of a youth apprenticeship.** More columns are included below for those who choose to conduct more frequent reviews.

1	***Working to Meet Expectations:*** Needs improvement; requires much assistance and supervision; rarely displays this behavior
2	***Meets Expectations:*** Meets entry-level criteria; requires some supervision; often displays this behavior
3	***Exceeds Expectations:*** Exceeds entry-level criteria; requires minimal supervision; consistently displays this behavior

Occupational Competencies	**Ratings**			
Competency and Rating Criteria	**Minimum Rating of 2 for EACH Check Rating**			
	Initial	**Mid Year 1**	**Mid Year 2**	**Final**
1. Organize and analyze data • collect testing data and results • keep accurate notes and details about your work • use statistical tools • create tables and graphs • query and extract information from data • interpret graphs and the trends • manipulate data • create models, reports, plans, processes, or project forms • document analysis process and tools used • draw conclusions based on analysis	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**
2. Present scientific data • choose a topic based on current research or a project at the worksite • outline information on the topic • collect information and data • identify and prepare support materials • prepare presentation in oral, written, and/or visual formats • report information with the intent of being informational and instructive • explain technical concepts to non-technical audiences • use professional terminology • use appropriate multimedia resources • deliver presentation	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**

Occupational Competencies	Ratings			
Competency and Rating Criteria	**Minimum Rating of 2 for EACH Check Rating**			
	Initial	**Mid Year 1**	**Mid Year 2**	**Final**
3. Grow and/or care for plants and/or lab animals • review protocols for growth and care of plants and/or animal • follow safety precautions • obtain equipment and supplies • prepare planting spaces • prepare soils/media • plant seeds, seedlings, or cuttings • monitor plants for light, moisture, and temperature requirements • mix and apply fertilizers and additives • measure growth or other characteristics • document planting and feeding • clean animal quarters • follow safe handling procedures • mix feed, additives, and/or medicines • measure growth and physical characteristics • manage animal waste • document care and feeding	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
4. Collect plant or animal tissues from source • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • obtain sample from analyte source • follow blood collecting procedures • follow plant collection procedures • follow animal tissue collection procedures • store collected sample for further testing • document collection • clean equipment	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3

Occupational Competencies	Ratings			
Competency and Rating Criteria	**Minimum Rating of 2 for EACH Check Rating**			
	Initial	**Mid Year 1**	**Mid Year 2**	**Final**
5. Isolate and/or purify cells, microbes, nucleic acids and/or proteins • follow safety protocols • wear Personal Protective Equipment (PPE) • Obtain equipment and supplies • Prepare reagents, solutions, and/or buffers • Obtain sample from analyte source • Separate desired cell set with cell sorter, antibody columns, magnetic beads, chromatography, etc. • Layer on density gradient • Centrifuge at correct speed • Isolate cells in question • Culture cells, microbes, nucleic acids and/or proteins • Isolate cells, microbes, nucleic acids and/or proteins • Purify cells, microbes, nucleic acids and/or proteins • Examine isolation and/or purification with blotting, ELISA, flow cytometry, spectroscopy, etc. • Complete any further purification procedures • Store isolated and purified analyte subset for further testing • Document isolation and/or purification procedures • Clean and shut down equipment	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**
6. Quantify and/or identify cells, microbes, nucleic acids and/or proteins • follow safety protocols • wear Personal Protective Equipment (PPE) • Obtain equipment and supplies • Prepare reagents, solutions, and/or buffers • Sample and transfer the purified analyte in question • Create serial dilutions • Stain and/or label analyte in sample to be counted as required by protocol for microscopy, cytometry, spectrophotometry, etc. • Obtain readings and/or calculate number of analytes considering any dilution factor • Document counts and calculations as required • Identify cells, microbes, nucleic acids and/or proteins • Quantify cells, microbes, nucleic acids and/or proteins • Document identification procedure as required • Clean and shut down equipment	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**

Occupational Competencies	Ratings			
Competency and Rating Criteria	**Minimum Rating of 2 for EACH Check Rating**			
	Initial	**Mid Year 1**	**Mid Year 2**	**Final**
7. Culture cells and/or microbes • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • isolate and/or purify analyte to be cultured • prepare culture growth media with appropriate growth factors, pH, etc. • use aseptic technique to sample • transfer analyte to suspension media or to adherent surface media components • store culture in area of appropriate temperature, humidity, light, and gas mixture as required by protocol • inspect culture for color, pH, cloudiness, etc. • examine analyte cells for viability, morphology, density, etc. • feed culture as required by protocol • document culture and feeding as required • clean and shut down equipment	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
8. Harvest cells and/or microbes • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • remove analyte cells from suspension culture for further processing • remove analyte cells from adherent cultures mechanically, chemically and/or with enzymes • wash cells or colony • transfer harvested cells to fresh medium • examine harvest for viability • quantify analyte cells • document harvesting • clean and shut down equipment	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
9. Perform spectroscopy • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • prepare sample as required for spectroscopic analysis • blank, zero or run control on the spectrophotometer • run sample as required • note the reading(s) • calculate and analyze the results • document testing • clean and shut down equipment	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3

Occupational Competencies	Ratings			
Competency and Rating Criteria	**Minimum Rating of 2 for EACH Check Rating**			
	Initial	**Mid Year 1**	**Mid Year 2**	**Final**
10. Perform chromatography • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • prepare sample as required for chromatographic analysis • run control(s) along with sample • note the reading(s) • calculate and analyze the results • document testing as required • clean and shut down equipment	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
11. Perform microscopy • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • set control and magnification settings to scan first • adjust light aperture, power, stage, etc. according to protocol • mount sample • stain samples according to protocol • return all settings to lowest magnification • power off microscope • wipe excess material as required • cover and store microscope as required • wash and dry slides as required • discard cover slips as required • document testing as required	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
12. Perform restriction digests • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • prepare sample as required for restriction digestion • combine buffer(s), nucleic acid sample and restriction enzymes • digest control(s) along with sample • centrifuge, incubate, and wash/cut/dye • document digestion procedure • clean and shut down equipment	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3

Occupational Competencies	Ratings			
Competency and Rating Criteria	**Minimum Rating of 2 for EACH Check Rating**			
	Initial	**Mid Year 1**	**Mid Year 2**	**Final**
13. Perform gel electrophoresis • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • prepare the sample as required • pour the gel • perform electrophoresis with appropriate stains, markers, controls, and samples • apply current • stop current when control marker approaches end of gel • remove gel • stain gel as required • visualize gel as required • note the reading(s) • calculate and analyze the results • document testing • clean and shut down equipment •	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
14. Perform amplification • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • prepare the nucleic acid sample • pipet amplification reagents into centrifuge tubes • pipet nucleic acid samples into tubes and mix • amplify the control(s) and nucleic acid through the required cycling profiles • analyze amplification products with gel electrophoresis • document amplification • clean and shut down equipment	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3

Occupational Competencies	Ratings			
Competency and Rating Criteria	**Minimum Rating of 2 for EACH Check Rating**			
	Initial	**Mid Year 1**	**Mid Year 2**	**Final**
15. Perform blot assays • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • prepare the sample • perform gel electrophoresis to separate and isolate desired bio-molecule • transfer separate bio-molecule to membrane • hybridize with labeled target probe • wash unbound tags • detect and visualize the pattern • calculate and analyze the results • document testing	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**
16. Prepare samples for nucleic acid sequencing • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • prepare nucleic acid to be sequenced as a single strand • analyze sequence data	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**
17. Perform cellular assays • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • harvest cells to be manipulated • conduct the testing according to protocol • calculate and analyze the results • document assay procedure as required • clean and shut down equipment	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**

Occupational Competencies	Ratings			
Competency and Rating Criteria	**Minimum Rating of 2 for EACH Check Rating**			
	Initial	**Mid Year 1**	**Mid Year 2**	**Final**
18. Perform immunoassays (ELISA) • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • prepare the sample as required • prepare test plate with capture antigen or antibody • add sample to each test well • wash test plate • add labeled antibody-enzyme conjugates • wash test plate • visualize wells • calculate and analyze the results • document assay procedure • clean and shut down equipment	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
19. Perform protein quantification assays • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • separate and isolate protein to be tested • conduct the testing according to protocol • use technologies such as electrophoresis, elisa, flow cytometry, spectroscopy, etc. • calculate and analyze the results • document assay procedure as required • clean and shut down equipment	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3
20. Perform transfection • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • isolate and purify the nucleic acid material to be transfected • incubate the vector deoxyribonucleic acid (DNA), insert DNA, DNA Ligase, and buffers • prepare the vector with promoter elements and/or resistance markers • isolate competent host cells • transfect the host according to protocol • wash, store and/or culture cells • document procedure • clean and shut down equipment	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3	☐ 1 ☐ 2 ☐ 3

Occupational Competencies	Ratings			
Competency and Rating Criteria	**Minimum Rating of 2 for EACH Check Rating**			
	Initial	**Mid Year 1**	**Mid Year 2**	**Final**
21. Perform basic cloning (transformation) • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • isolate and purify the nucleic acid material to be cloned • prepare the vector • perform genetic engineering aspects of preparing the vector with your gene of interest • prepare or thaw competent host cells • transform the cells • wash and plate cells • incubate • harvest cells • check/select cloned cells with gel electrophoresis • document procedure • clean and shut down equipment	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**
22. Run expression cloning tests • choose the appropriate test for cloning genetic analysis • follow safety protocols • wear Personal Protective Equipment (PPE) • obtain equipment and supplies • prepare reagents, solutions, and/or buffers • perform basic cloning • analyze genes and gene expression using technologies such as polymerase chain reaction (PCR), reverse transcription – polymerase chain rection (RT-PCR), deoxyribonucleic acid (DNA) sequencing, microarrays, hybridization, and karyotyping • examine results according to procedure used • document analysis procedure as required • clean and shut down equipment	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**
Competency Substitute (if you replaced a competency above, note the competency and rating)	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**	☐ **1** ☐ **2** ☐ **3**

Occupational Competencies	Ratings			
Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating			
	Initial	Mid Year 1	Mid Year 2	Final
Comments:				

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STATE OF WISCONSIN
DWD
Department of Workforce Development